## REMARKS

The following remarks are made in response to the office action mailed on March 26, 2007.

Included herewith is a one month petition of time to respond to the office action. Deposit Account 20-0823 may be charged a fee of $60 (fee code 2251) for the extension fee. It is believed that no other fees are due in connection with this paper. However, in the event that any additional fees are necessary to prevent abandonment of this application, any such fees are hereby authorized to be charged to our Deposit Account 20-0823.

The examiner is thanked for his courtesies extended to the undersigned and Applicant's representatives during an interview on July 24, 2007. It is believed that the discussions were productive and the examiner's insight and comments were helpful in allowing Applicant to address below the substantive grounds of rejection set forth in the office action of March 26, 2007. In this response, Applicant has amended claims 23, 28, 33, 35, 36, 41, 44, and 46, and canceled claims 24, 32, 34, 45, and 47-51. New claims 52-55 have been added. Thus, claims 23, 25-31, 33, 35-44, 46, and 52-55 are pending in the application for the examiner's consideration.

## The §112 Rejections:

In the office action, 23-51 were rejected under 35 U.S.C. §112 for failing to comply with the written description requirement and for failing to set forth that which the inventor regards as the invention. In view of the amendments herein, reconsideration and withdrawal of this rejection is respectfully requested.

Independent claims 23 and 35 have been amended herein to recite a method and apparatus for receiving input data representing physical characteristics of an individual, processing the input data to generate an output representing class specific probability

distributions based on the received input data, computing a transform based on the output, transforming the probability distributions onto a normalized scale based on the transform, determining an equal error rate associated with the class-specific probability distributions, and establishing at least one decision criterion based upon the equal error rate wherein the at least one decision criterion corresponds to a level of similarity between a sample and the physical characteristics of the individual.

The system and methods disclosed and claimed by Applicant are applicable to computational methods and systems for assessing the similarity between a sample and physical characteristics of an individual of a known classification, such as speech characteristics or other biometric information. The specification provides several examples of such systems. One embodiment describes providing an adaptive speaker identity verification system where the operating criterion may be defined in terms of an equal error rate (EER). Application 4:14-15. As is known, the physical characteristics of an individual's speech may include physiological factors and behavioral factors. With respect to an individual's speech characteristics, the physical characteristics may be attributed to physiological factors associated with the individual's lungs, larynx, vocal cavities, nose aperture, mouth aperture, and sibilants, and the behavioral factors may be attributed to phonetics, such as articulation, formants, phoneme-to-phoneme junctures, and prosodics. These types of physical characteristics may be modeled from multiple instances of speaking the same phrase in order to capture the inherent variability in pronunciation. Application 4:11-13. The multi-dimensional class-specific probability distributions associated with the physical characteristics of biometric information such as speech characteristics are then transformed and mapped onto a continuous scale. Generally speaking, class specific probability distributions related to high probabilities of dissimilarity and similarity

may be mapped into a scale that is linear in cumulative probability, and class specific

distributions related to lower probabilities of dissimilarity and similarity may be mapped into a

scale that is linear in the ratio of false-rejection to false-acceptance probabilities. Application at

8 – 9. As the specification makes clear, other methods for combining the class specific

probability distributions are also possible, for instance, a scale with two regions formed by EER

criterion that represent the likelihood of a test or sample belonging to a particular class.

Application 9:8-15.

As amended herein, the claims do not require the identity of the individual to

authenticated in the manner as described in the comments in the office action; rather the claims

recite subject matter directed to methods and systems for determining a level of similarity

between a sample and physical characteristics on an individual based upon class specific

probability distributions developed from input data comprising physical characteristics on the

individual. In view of the amendments to the independent claims herein and the cancellation of

claims 47-51, it is submitted that the currently pending claims meet the requirements of §112, ¶1

and ¶2, and withdrawal of the rejections is respectfully requested.

**The §101 Rejections:**

In the office action, claims 23-49 were rejected under 35 U.S.C. § 101 on the grounds

that the claimed invention is directed to non-statutory subject matter. Specifically, the office

action states that the language of the claims is directed merely to an abstract idea (transforming a

mathematical algorithm such as a probability distribution) that has no limitation to a practical

application which produces a concrete, useful and tangible result. Reconsideration of the

rejection is respectfully requested.

In determining whether subject matter meets the requirements of §101, the proper inquiry "focuses on whether the mathematical algorithm is applied in a practical manner to produce a useful result." *AT&T Corp. v. Excel Comm'cns, Inc.*, 172 F.3d 1352, 1360, 50 U.S.P.Q.2d 1447, 1454 (Fed. Cir. 1999); *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 47 U.S.P.Q.2d 1596 (Fed. Cir. 1998); *Arrhythmia Research Technology Inc. v. Corazonix Corp.*, 958 F.2d 1053, 22 U.S.P.Q.2d 1033 (Fed. Cir. 1992). The *Arrhythmia Research Technology* case has some facts that are analogous to those here in that the both deal with numeric output. In *Arrhythmia Research Technology*, the Federal Circuit held that the transformation of electrocardiograph signals from a patient's heartbeat by a machine through a series of mathematical calculations constituted a practical application of an abstract idea (a mathematical algorithm, formula, or calculation), because it corresponded to a useful, concrete or tangible thing -- the condition of a patient's heart. An analogous method and process is recited by independent claims 23 and 35. Under the claimed process and system, several categories of input data (for instance, physical characteristics of an individual of a known classification, e.g., biometric information, such as speaker identity verification, etc.) are received, and that data is then processed (i.e., generating probability distributions, computing a transform, and transforming the distributions onto a scale) in a way to produce a tangible, concrete, and useful result, (i.e., establishing a decision criterion based upon the equal error rate that corresponds to a level of similarity between a sample and the physical characteristics of the individual). For two separate and independent reasons, the system and method of the claims recite statutory subject matter: (a) the claims require a transformation of a physical property, namely, the transformation of physical characteristics of a individual by receiving, processing, and eventually transforming onto a normalized detector scale data related to the physical characteristics of an individual; and

(b) requiring post algorithm processing steps, namely establishing a decision criteria corresponding to a level of similarity between a sample and the physical characteristics of the individual. *See* MPEP 2106.IV.C.2(1) and MPEP 2106.IV.C.2(2). For these reasons, withdrawal of the rejections is requested.

**The §103 Rejections:**

In the office action claims 23, 35, 48, 50 and 51 were rejected as being unpatentable over Hamid (U.S. Pat. No. 6,038,334) in view of Campbell "Object recognition for an Intelligent Room." Reconsideration and withdrawal of this rejection is requested.

The Hamid reference generally discloses a system for authenticating biometric information using dimensional probability distribution curves. The Campbell reference relates to developing recognition algorithms for identifying physical objects based upon the Hough kernel. Both references teach methods and systems that entirely different and could not be combined in a manner to render the subject matter of the claims obvious. The Campbell reference relates to a system for locating a three dimension object from a two dimensional color image generated by a video camera. There is nothing in the Campbell reference suggesting that it can be used to determine whether a sample is similar to a physical characteristic on an individual. Similarly, there is nothing in Hamid suggesting the need to transform the output of the probability distributions. Thus, it is submitted that the claims are patentable over these references.

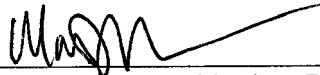<div align="center">

**CONCLUSION**

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It is believed that a full and complete response has been made to the outstanding office action, and as such, the present application is in condition for allowance. If the Examiner has any outstanding issues regarding the present application, he is urged to contact the undersigned at the number listed below.

Applicant respectfully requests that all future correspondence be addressed to applicant's representative below.

Respectfully submitted,

THOMPSON COBURN LLP

Date: 7/16/2007

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